

Curriculum Vitae

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Coordinates in Administrative Space

Name: **Gergely János SZÖLLŐSI**
Date of birth: **January 10th, 1979**
Place of birth: **Debrecen, Hungary**
Address: **3 rue de l'Abbe Rozier,
69001 Lyon France**
E-mail: Gergely-Janos.Szollosi@univ-lyon1.fr
Nationality: **Hungarian**

Education & Academia

2011 – **Marie Curie Fellow** [Bioinformatics and Evolutionary Genomics Group](#)
at the [Laboratoire de Biométrie et Biologie Évolutive](#) in Lyon, France.
2009 – 2010 **Postdoctoral researcher**, [Bioinformatics and Evolutionary Genomics Group](#)
at the [Laboratoire de Biométrie et Biologie Évolutive](#) in Lyon, France.
2005 – 2009 **PhD in Physics** at **Eötvös University's**
[Statistical and Biological Physics PhD Program](#).
2008 Nov-Dec **Research Associate at KITP's**
[Population Genetics and Genomics Program](#) at UCSB.
2008 Feb-March **Visiting PhD student** at Prof.
[Magnasco's Group](#) at Rockefeller University.
2007 Nov-Dec **Visiting PhD student** at the [Lässig Group](#) at the
[Institute for Theoretical Physics, University of Cologne](#).
2005 **Assistant Scientific Advisor** at the Hungarian Academy of Science's
[Biological Physics Research Group](#).
2005 **M.Sc. in physics** from the [Faculty of Science](#) at **Eötvös University**.
2004/05 I spent a semester at **København University's** Niels Bohr Institute as a recipient
of European Physical Society's [EMSPS](#) scholarship to study biological physics.
2002/03 I spent a semester at **Humboldt University Berlin's** Department of Physics
as an ERASMUS student for the winter semester.
2000 – 2003 I completed 3 years at **Budapest University of Technology
and Economics**, [Faculty of Electrical Engineering and Informatics](#),
before suspending my studies in favor of physics.
1994 – 98 Kossuth Lajos High School, (specializing in physics), Debrecen, Hungary.
1993 – 94 Raoul Wallenberg High School, San Francisco, California.

Research

During my time at the [Biological Physics Department](#) at Eötvös University I worked under the guidance of [Dr. Imre Derényi](#).

Currently I am a postdoc working with [Vincent Daubin](#) and [Eric Tannier](#). We are interested in reconstructing the history of genomic descent (the tree of genomes) together with inference of the genomic process (Duplication Transfer and Loss) that relate it to the histories of its constituent parts (the forest of gene trees).

My research interests include:

Evolutionary Dynamics and Genomics

1. **Evolution of robustness**
2. **Phylogenomics of Horizontal Gene Transfer**
3. **Evolutionary dynamics of prokaryotic genomes**
4. **Positive selection and the effects of genetic linkage**
5. **Evolutionary games and population structure**

Long-term Goals

I see the long-term goal of my research in using population genetics and evolutionary theory together with genomic sequence data to understand biological innovation through developing a quantitative understanding of genome and regulatory network design and the evolutionary process by which they emerged.

Biophysics

1. **Kinesin:** Constructing a thermodynamically consistent model of the motor protein kinesin.
2. **Self Propelled Particle** models of the collective migration of tissue cells.
3. Equilibrium models of Protein Adsorption.

Computer Science

I have in the past also been involved in the [EURESCOM](#) project NEW DIMENSIONS (NEtWork DIMENSIONing baSed on modeling of Internet traffic) at Budapest University of Technology and Economics, where I worked on a stochastic timer approach to feedback optimization of multicast networks under the guidance of [Prof. János Levendovszky](#)

Publications

H-index: 6, [ResearcherID: F-6379-2010](#) or [Google Scholar: Szollosi, GJ.](#)

Articles in Peer Reviewed Journals

1. Schiffels, S*; Szöllösi, GJ*; Mustonen, V; Lässig, M:
*equal contrib.
Emergent neutrality in adaptive asexual evolution.
Genetics, **189**, 1361-75 (2011). [doi:10.1534/genetics.111.132027](#)
2. Rauscher, AÁ; Simon, Z; Szöllösi, GJ; Gráf, L; Derényi, I;
Malnasi-Csizmadia, A:
**Temperature dependence of internal friction in
enzyme reactions.**
FASEB J. **25**, 2804-13 (2011). [doi:10.1096/fj.11-180794](#)
3. Czövek, A; Szöllösi, GJ; Derényi, I: **Neck-linker docking coordinates
the kinetics of kinesin's heads.**
Biophys J. **100** 1729-1736 (2011). [doi:10.1016/j.bpj.2011.01.039](#)
4. Katifori E; Szöllösi, GJ; Magnasco, MO:
**Damage and fluctuations induce loops in optimal transport net-
works** *Phys. Rev. Lett.* **104**, 048704 (2010). [arXiv:0906.0006](#)
5. Szöllösi, GJ; Derényi, I:
**Congruent evolution of genetic and enviromental robustness in
microRNA.**
Mol. Biol. Evol. **26**, 867 (2009). [arXiv:0810.2658](#)
6. Szöllösi, GJ; Derényi, I:
Evolutionary Games on Minimally Structured Populations
Phys. Rev. E, **78**, 031919 (2008). [arXiv:0704.0357](#)
7. Czövek, A; Szöllösi, GJ; Derényi, I:
The relevance of neck linker docking in the motility of kinesin.
BioSystems **93**, 29-33 (2008). [arXiv:0804.3275](#)
8. Szöllösi, GJ; Derényi, I:
**The effect of recombination on the neutral evolution of genetic
robustness.**
Math. Biosci. **214**, 58-62 (2008). [arXiv:0804.3279](#)
9. Szöllösi, GJ; Derényi, I; Vellai, T:
**The Maintenance of Sex in Bacteria is Ensured by its Potential
to Reload Genes**
Genetics **174**, 2173-2180 (2006). [arXiv:q-bio/0609052](#)

10. Szabó, B; Szöllősi, GJ; Gönci, B; Jurányi, Zs; Selmeczi, D; Vicsek, T:
**Phase Transition in the Collective Migration of Tissue Cells:
Experiment and Model**
Phys. Rev. E **74**, 061908 (2006). [arXiv:q-bio/0611045](https://arxiv.org/abs/q-bio/0611045)
11. Szöllősi, GJ; Derényi, I; Vörös, J:
**Reversible Mesoscopic Model of Protein Adsorption:
From equilibrium to dynamics**
Physica A **343**, 359-375 (2004). [arXiv:cond-mat/0511255](https://arxiv.org/abs/cond-mat/0511255)

Proceedings and Book Chapters

1. Szöllősi, GJ; Daubin, V:
**Modeling Gene Family Evolution and Reconciling Phylogenetic
Discord**
in *Evolutionary Genomics: Statistical and Computational Methods, Vol-
ume 2* ed. Maria Anisimova, Springer (2012).
ISBN-10: 1617795844
2. Doyon, JP; Scornavacca, C; Gorbunov, K; Szöllősi, GJ; Ranwez, V;
Berry, V:
An efficient algorithm for gene/species trees parsimonious reconciliation
with losses, duplications and transfers.
Comperative Genomics, LNCS **6398** 93-108 (2011). [doi:10.1007/978-3-642-16181-0_9](https://doi.org/10.1007/978-3-642-16181-0_9)

Talks

1. [Horizontal gene transfer as a molecular clock at SMBE 2010 Lyon](#)
2. Hierarchical Meanfield Theory of Evolutionary Games on Structured Populations
ECCS 2007 Dresden ([video](#))¹; ([slides](#))
3. Phase Transition in the Collective Migration of Tissue Cells
[STARFLAG meeting 2006. Nov. Paris, France](#)
4. A kinezin nyomában: lépések egy termodinamikailag konzisztens modell felé
[Nanobiológia szimpózium 2006. Pécs, Hungary](#)

Posters

1. Szöllősi, GJ;Derényi **The effective temperature of mutations: A general mechanism for the congruent evolution of robustness**
[Poster at RECOMB CG 2009, Budapest, Hungary](#)
2. Szöllősi, GJ;Derényi, I; Vellai T:
The Maintenance of Sex in Bacteria is Ensured by its Potential to Reload Genes
[Poster at RECOMB 2007, San Francisco, CA](#)
3. Szöllősi, GJ;Derényi, I; Vellai T:
Resolving the Paradox of Bacterial Sex: A Statistical Physics Approach
[Poster at Fundamental Problems in Statistical Physics XI, Leuven, Belgium](#)
4. Halter, M.; Huwiler, Ch; Szöllősi, GJ; Derényi, I; Vörös, J:
New Approach Towards Protein Adsorption and Exchange
[Poster at Biomaterials '04](#)
5. Derényi, I;Szöllősi, GJ; Halter, M.;Vörös, J:
New Approach Towards Protein Adsorption and Exchange
[Poster at STATPHYS 22, Bangalore, India](#)

¹http://videlectures.net/eccs07_gergely.hmt/

Academic References

Dr. Imre Derényi (Dept. Biological Physics, Eötvös University)

Dr. Derényi was my PhD supervisor.

derenyi@angel.elte.hu

Dr. Vincent Daubin (CNRS, LBBE UCB Lyon 1)

Dr. Daubin is my Postdoctoral supervisor.

Vincent.Daubin@univ-lyon1.fr

Dr. Eric Tannier (INRIA, LBBE UCB Lyon 1)

Dr. Tannier is my Postdoctoral co-supervisor.

Eric.Tannier@univ-lyon1.fr

Prof. Michael Lässig (Institute of Theoretical Physics, University of Cologne)

I currently collaborate with Prof. Lässig on clonal interference and have visited his group several times during the past.

lassig@thp.uni-koeln.de

Dr. Tibor Vellai (Dept. Genetics, Eötvös University)

I have worked with Dr. Vellai on Natural Genetic Transformation.

vellai@falco.elte.hu

Prof. Tamás Vicsek (Dept. Biological Physics, Eötvös University)

I have worked with Prof. Vicsek on Collective Motion and have had the opportunity to collaborate with his group during various other projects.

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Skills, Experience

I have experience applying the methods of statistical physics (both analytical and numerical) to interdisciplinary problems. During my PhD studies I have focused on studying population genetics and evolutionary theory. I have become familiar during the course of my PhD with various scientific databases and bioinformatics applications. I have experience in implementing numerical algorithms, and am particularly familiar with ODE/SDE solvers, Monte Carlo methods and numerical optimization techniques (e.g. simulated annealing). During my postdoctoral work I have also had the opportunity to gain experience in the theory and practice of phylogenetic inference and the manipulation large scale sequence data.

I have extensive experience with Linux/Unix including OS X, which I use for both work and entertainment. I have worked in C/C++, Fortran and some Java and currently use C++, relying on Bio++ and Boost. During my studies I have regularly used Mathematica and Maple and occasionally R.

Work Experience

For about one year during 2001 and 2002 I held a part time job at [DesignSoft](#), where I was part of the Newton project, a 3D educational software designed to aid in the teaching of simple mechanical machines-devices.

During May-June 2007 I participated in a short term project involving the application of machine learning techniques to drug target prediction at [Rényi Institute](#) under the guidance of [István Miklós](#).

Language Skills

Hungarian is my mother tongue.

English: I am fluent in both spoken and written English.

(I spent 3.5 years in the United States and hold an advanced language certificate.)

German: intermediate

Hobbies

I enjoy reading both modern English and Hungarian literature (my current favorites would be Péter Esterházy, Salman Rushdie and Orhan Pamuk), as well as science fiction writers. I love to cook. Given the chance I like to go hiking or running someplace green.